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**Methodology for Evaluating & Negotiating
Independent Research & Development and
Bid & Proposal Costs**

Army Procurement Research Office

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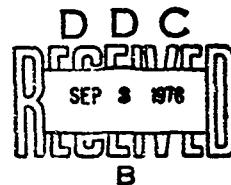
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INDEPENDENT RESEARCH AND DEVELOPMENT AND
BID AND PROPOSAL COSTS

JULY 1976



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ARMY PROCUREMENT RESEARCH OFFICE

U.S. ARMY LOGISTICS MANAGEMENT CENTER
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JULY 1976

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EXECUTIVE SUMMARY

1. PROBLEM. There is only limited guidance on how to evaluate independent research and development (IR&D) and bid and proposal (B&P) costs for those contractors that require the negotiation of advance agreements. With only limited guidelines for determining the equitability or creditability of such costs, it is exceedingly difficult to evaluate and negotiate appropriate costs.
2. OBJECTIVE. The development of simple, equitable and creditable methods or techniques in the evaluation and negotiation of advance agreements for IR&D and B&P is the objective of this report.
3. METHODOLOGY. Current methods and techniques of evaluating and negotiating IR&D and B&P costs were evaluated. Personnel of the three Military Services and the Defense Supply Agency (DSA) involved with IR&D and B&P negotiations were interviewed. Also, previous research studies and GAO reports on the subject were reviewed.
4. CONCLUSIONS AND RECOMMENDATIONS. Each of the three Services and the DSA have their own unique approaches to the evaluation and negotiation of advance agreements for IR&D and B&P. For prenegotiation evaluation purposes, the Air Force employs a structured approach while the Navy and the DSA are more flexible in their approaches. The Army's approach is more structured than the approaches of the Navy and the DSA and is more flexible than the approach of the Air Force.

After review of the evaluation and negotiation techniques of the three Services and the DSA, it is concluded that none of the present techniques are as plausible as would be hoped. Notwithstanding DOD

general policy guidance on factors to be considered in evaluating IR&D and B&P costs, the Services and the DSA, in practice, consider these factors in different ways. In fact, these approach differences may result in unequal treatment of contractors. This is especially true when the allowability of IR&D and B&P costs of those contractors not required to negotiate advance agreements are considered.

To provide a more plausible technique for the evaluation and negotiation of advance agreements for IR&D and B&P, a new approach is recommended. First, the Armed Services Procurement Regulation (ASPR) formula is utilized for evaluation purposes. Next, other pertinent adjustment factors such as contractor contribution, contract mix, ratio of cost reimbursement contracts to IR&D, and technical assessment and evaluation of IR&D programs are considered. Unlike other approaches, the recommended approach is considered to be more plausible and provides for more consistent treatment of those contractors required and not required to negotiate advance agreements. However, implementation and refinement of the recommended approach would require a test period. If the appropriateness of the recommended approach is verified during the test period, its use should satisfy the study objective and provide the Army with another and, hopefully, superior method of evaluating and negotiating advance agreements for IR&D and B&P.

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CHAPTER I
INTRODUCTION

A. BACKGROUND

In short, independent research and development (IR&D) is contractor initiated and independently managed research and development not required in the performance of a contract or grant. Bid and proposal (B&P) costs are those costs incurred by contractors in preparing, submitting, and supporting bids and proposals. IR&D and B&P are necessary costs of doing business. Such costs directly support and encourage technical and price competition within industry as a whole and within the defense industry in particular. Under the IR&D program, contractors have the freedom to explore the unknown, advance the state of the art and, in the process, benefit the US economy and the defense effort. Also, this freedom provides contractors with opportunities to direct their IR&D efforts into those areas that are perceived to be most productive. Therefore, the free market process can be harnessed and utilized in the development of new and spin-off technology. This same competitive spirit is also part of the rationale which supports the allowability of B&P costs. Such costs are necessary to enable contractors to effectively compete for defense programs. Without the allowability of both IR&D and B&P costs, contractors, other than those large companies in sole source situations, would be severely hampered in their technical and price competition efforts.

B. PROBLEM

IR&D and B&P costs are topics of general concern with the executive and legislative branches of the Government. Within the Defense Department

there is a specific and pragmatic concern over how to fairly evaluate and negotiate IR&D and B&P costs. With only limited guidelines for determining the equitability or creditability of such cost, it is exceedingly difficult to evaluate and negotiate appropriate costs.

C. OBJECTIVE

The objective of this report is to develop simple, equitable, and creditable methods or techniques which will be of value in the evaluation and negotiation of advance agreements for IR&D and B&P.

D. SCOPE

Current methods of evaluating and negotiating IR&D and B&P costs by the Army and other defense procurement activities were addressed during the brief research effort. Potential bases for determining IR&D and B&P entitlement, e.g., volume of total sales, proportion of Government sales, mix of R&D and supply contracts, weighted guidelines elements, as well as previous IR&D/B&P determinations, were examined. Previous research studies and GAO reports concerning the subject of the study were reviewed. Also, DOD personnel responsible for evaluating and negotiating IR&D/B&P proposals were interviewed.

E. ORGANIZATION OF REPORT

General cost and technical factors considered during the evaluation and negotiation of IR&D and B&P costs as well as the organization and procedures for conducting such negotiations are included in Chapter II. Chapter III reviews existing methods of analyzing IR&D and B&P costs. Suggested improvements in the evaluation and negotiation process are contained in Chapter IV. Finally, Chapter V contains the report's conclusions and recommendations.

CHAPTER II
EVALUATION AND NEGOTIATION OF IR&D AND B&P

A. TECHNICAL AND COST CONSIDERATIONS

Companies which receive payments, either as prime contractors or subcontractors, in excess of \$2 million from the DOD for IR&D and B&P in a fiscal year are required to negotiate advance agreements with the Government to establish ceilings for allowability of their IR&D and B&P costs for the following fiscal year.¹ Presently, advance agreements for IR&D and B&P are negotiated with 104 contractors. Breakout by Services are: the Defense Supply Agency (DSA) are: Army, 9 contractors; Navy, 50 contractors; Air Force, 42 contractors; and DSA, 3 contractors.²

The Services and the DSA perform their own negotiations with the Navy and Air Force performing the majority of the negotiations. A uniform negotiation method by each of the Services and DSA is the stated goal. However, there has been only limited guidance in this area. As a result, each of the Services and the DSA have different approaches to IR&D and B&P negotiations. Unfortunately, different approaches may result in unacceptable differences in the IR&D and B&P ceilings negotiated. In fact, GAO identified deficiencies in the DOD guidance provided to the respective IR&D and B&P negotiation groups.³ Therefore, a joint DDR&E/ASA(I&L) memorandum dated 21 October 1974 provided general policy

¹ ASPR 15-205.3(d)(2) and 15-205.35(d)(1).

² DPC #75-3 of 3 Oct 75.

³ Comptroller General. Payments for Independent Research and Development and Bid and Proposal Costs, B-167034, April 1973 and Department of Defense's Implementation of Section 203, Public Law 91-441, Involving Contractors' Independent Research and Development, B-164912, May 1974.

guidance for negotiation of IR&D and B&P and required that technical evaluations be considered during such negotiations. Several of the memorandum's significant points are summarized as follows:

- The goal is equal treatment of all contractors.
- File documentation must be maintained to provide the rationale for negotiations.
- Technical evaluation of IR&D programs must have an effect on the ceiling negotiated.
- Three year advance agreements are encouraged.
- Inflationary or deflationary economic factors are considered.
- A technical representative must participate in prenegotiation meetings.
- Non-relevant projects can be included in the ceiling if there are enough relevant projects to cover all costs allocated to the DOD.⁴

The following summarizes the respective organizations and negotiation methods used by the three Services and the DSA.

B. ORGANIZATION AND PROCEDURES FOR NEGOTIATIONS

Each of the three Services has centralized the negotiation of IR&D and B&P within its respective organization. However, in the case of the DSA, separate DCASR's negotiate the advance agreements for the three contractors assigned. Of the three Services, only the Air Force employs what is termed a "structured approach." A guideline has been developed by the Air Force and is used by the negotiator in developing his negotiation objective. This objective is reviewed by the negotiator, his

⁴DDR&E/ASA(I&L) Memorandum dated 21 Oct 74.

supervisor, and the IR&D technical manager. Deviation from the guideline is possible and is permitted subject to higher level review and approval.⁵

The Navy's approach is the least structured of the three Services. There is only one Navy contracting officer for IR&D and B&P negotiations. The contracting officer has two supporting negotiators and is solely responsible for establishing negotiation objectives and for reaching agreements with contractors. A guideline approach is not used although many factors are subjectively evaluated and used in establishing negotiation objectives. The DSA also employs a similar method of evaluating and negotiating advance agreements for IR&D and B&P.

The Army's approach to negotiating IR&D and B&P is more structured than the approaches of the Navy and the DSA. The Army uses various guidelines in developing their negotiation objectives. However, the Army is seemingly more flexible than the Air Force in their reliance on such guidelines.

⁵Bethel, H. E. An Overview of DOD Policy for and Administration of Independent Research and Development, Defense Systems Management School, May 1975, p. 50.

CHAPTER III
METHODS OF ANALYZING IR&D AND B&P

A. ASPR FORMULA METHOD

Companies which receive IR&D and B&P payments, either as prime contractors or subcontractors, less than \$2 million from the DOD in a fiscal year are not required to negotiate advance agreements. Such companies are reimbursed for their IR&D and B&P costs pursuant to a formula contained in the Armed Services Procurement Regulation (ASPR). The formula contains the following steps:¹

1. Determine the ratio of IR&D costs to total sales (or other base acceptable to the contracting officer) for each of the preceding three years and average the two highest of these ratios; this average is the IR&D historical ratio;
2. Compute the average annual IR&D cost (hereafter called average), using the two highest of the preceding three years;
3. IR&D costs for the center for the current year which are not in excess of the product of the center's actual total sales (or other accepted base) for the current year and the IR&D historical ratio computed under 1 above (hereafter called product) shall be considered allowable only to the extent the product does not exceed 120% of the average. If the product is less than 80% of the average costs up to 80% of the average shall be allowable;
4. Costs which are in excess of the ceiling computed in 3 above are not allowable except where the ceiling computed for bid and proposal costs under 15-205.3 is reduced in an amount identical to the amount of any increase over the IR&D ceiling computed in 3 above.²

¹The same formula approach, appropriately modified, is used for both IR&D and B&P.

²ASPR 15-205.35(d)(2).

A determination of the allowability of IR&D and B&P costs by the ASPR formula approach is retroactive, i.e., is computed after costs have been incurred. This differs from the advance agreement negotiations which prospectively establish IR&D and B&P ceilings.

B. OTHER METHODS

The ASPR formula method is the only formalized and officially recognized method of analyzing IR&D and B&P costs. However, other "rule of thumb" techniques are often used in analyzing contractors' IR&D and B&P costs. Some of these methods are known as "the same dollar ceiling as last year," "same ceiling as last year's actual expenditures," "same ceilings plus inflation factors," "same percent of IR&D/B&P to sales as negotiated or actually spent in prior year," and "average of negotiated ceilings to sales for past 3 years." These quantitative as well as other subjective techniques are presently calculated and are used as guides for developing negotiation positions. Structured derivations of the above methods plus quantitative adjustments for inflation and for changes in the technical evaluation of contractors' IR&D programs are also used for developing IR&D and B&P negotiation objectives.

In short, there are many techniques for evaluating IR&D and B&P costs. "Rule of thumb" and other techniques are of questionable value. However, these quantitative techniques and methods are definitely better than an entirely subjective or "seat of the pants" approach to the evaluation and negotiation of advancement agreements for IR&D and B&P.

CHAPTER IV

IMPROVING THE EVALUATION AND NEGOTIATION OF IR&D AND B&P

A. GENERAL

Currently, there is limited guidance on how to evaluate and negotiate appropriate IR&D and B&P ceilings for companies which receive over \$2 million in such payments. For those companies which receive less than this amount, the ASPR is very explicit and provides a formula which determines the allowability of such costs. To preclude the possibility of inconsistent treatment of contractors by the three Services and DSA, there is a consensus that more guidance is needed on how to evaluate and negotiate IR&D and B&P costs. A joint DDR&E and ASD(I&L) memorandum of October 1974 recognized this problem and provided additional general policy in this area. Other attempts, e.g., Dr. Forster's five-point plan, for improving and standardizing the IR&D evaluation process have been directed toward an alleviation of the perception of unequal treatment of contractors by the three Services and the DSA.¹ However, specific guidance on how to establish negotiation objectives when negotiating with contractors who receive over \$2 million in IR&D and B&P payments is woefully lacking. A structured and analytical approach to solving this problem is the subject of the remaining portions of this chapter.

¹Bethel, H. E., An Overview of DOD Policy for and Administration of independent Research and Development, Defense Systems Management School, May 1975, p. 51.

B. BASE IR&D AND B&P CALCULATION

How do you develop a simple, equitable and creditable method of evaluating and negotiating IR&D and B&P costs? The study objective is directed toward a solution of this perplexing, if not impossible, question. Many knowledgeable IR&D and B&P negotiators will scoff at anything less than a flexible and basically subjective "seat of the pants" approach to such negotiations. Others will expound use of one or more of the previously mentioned techniques as the "best approach." Others will combine and average the results of various techniques and make adjustments for negotiation purposes. Although their consistency in utilizing such approaches is lauded, their rationale for using such techniques is not adequately supported. Therefore, a consistent approach with more plausible rationale is a goal consistent with the study objective and worthy of further analysis.

The first step in this endeavor is the establishment of a base IR&D and B&P calculation. The ASPR formula for evaluating IR&D and B&P costs for companies less than \$2 million provides the nucleus for the base calculation. If IR&D and B&P costs of companies less than \$2 million are evaluated and allowed using this formula, it would seem that advance agreement negotiations should not deviate widely from the amount allowed using the ASPR formula method. If vast differences result when the ASPR formula is or is not used, it would appear that companies with less than \$2 million in IR&D and B&P costs are treated differently than those larger companies with costs over this amount. DOD does not support or recognize such a policy. In fact, differences between use or non-use

of the ASPR formula is perceived to result from consideration of unique and discernible factors of which there are many. Also other things being equal, "ceteris paribus," there would seem to be equal chances that not using the ASPR formula would result in the negotiation of a range of costs equally distributed on both sides of the specific result obtained when using the ASPR formula. Such a range of costs may be compared with the concept of "range of probable cost" when negotiating incentive contracts and deviation from the mean in statistics. In short, the ASPR formula method is recommended as the starting point for evaluating IR&D and B&P cost for those companies that require the negotiation of advance agreements. However, such a formula should be considered as merely a base calculation. Subjective and quantitative factors should also be considered in the evaluation and negotiation process. Identification of some of these unique and discernible IR&D and B&P evaluation factors will now be addressed.

C. CONTRACTOR CONTRIBUTION (IR&D & B&P)

When IR&D and B&P costs are being evaluated, it is often helpful to analyze the negotiated ceilings for prior years and the contractor's actual IR&D and B&P expenditures for these years. Such an analysis will show whether the contractor spends more than, equal to, or less than the ceiling amounts. If the contractor spends more than the ceiling amount, his contribution is not directly recovered from the DOD. Such over-expenditures may be considered as positive indication of the contractor's confidence in his IR&D or B&P programs. Such a contractor should be rewarded when advance agreements are negotiated. Conversely,

when a contractor fails to follow through and implement the IR&D and B&P programs previously envisioned, he should be penalized when advance agreements are negotiated. Therefore, the IR&D and B&P concept of contractor contribution is introduced. The percent that the contractor's contribution is over or under the respective ceilings will become positive or negative factors to be considered when evaluating and negotiating IR&D and B&P costs.

D. CONTRACT MIX (B&P)

The competitiveness and risk incurred by a contractor is reflected in several ways. One indicator is the types of contracts awarded. For example, one would normally expect more competition and, of course, more contractor risk in the award of firm-fixed price contracts. Therefore, when B&P costs are evaluated, it is recommended that the contractor's DOD contract mix for the prior year be evaluated. A technique similar to that employed under the weighted guidelines concept is recommended. In the proposed technique, contractors would be rewarded for fixed price contracts and penalized for cost reimbursement contracts. Maximum reward would go to those contractors with all firm-fixed price contracts. On the other hand, penalties would accrue for an excessive amount of cost reimbursement contracts with cost-plus-fixed fee contracts being considered the least desirable.

E. DOD COST REIMBURSEMENT CONTRACTS TO IR&D (IR&D)

When evaluating IR&D costs the contractor's involvement in other DOD funded research and development programs should be considered. For example, should a contractor with large direct funded DOD programs

in relation to his IR&D program be evaluated on the same basis as a contractor with a small DOD direct funded R&D program in relation to his IR&D program? For purposes of evaluation, it is suggested that those contractors with large DOD direct funded R&D programs be penalized, at least slightly, during negotiations for their IR&D ceilings. Conversely, those companies which received few R&D contracts from DOD should be encouraged in their Government funded IR&D efforts. Since timely data on DOD R&D awards and incurred expenses is not readily available, it is suggested that a three year average of DOD cost reimbursement contracts be used as for comparison against the actual amount of IR&D costs incurred by the contractor during the latest year available. This analysis, although not entirely accurate, should at least provide an approximation of the contractor's direct funded R&D program in relation to his IR&D program.

F. TECHNOLOGICAL ASSESSMENT AND EVALUATION OF IR&D PROGRAMS (IR&D)

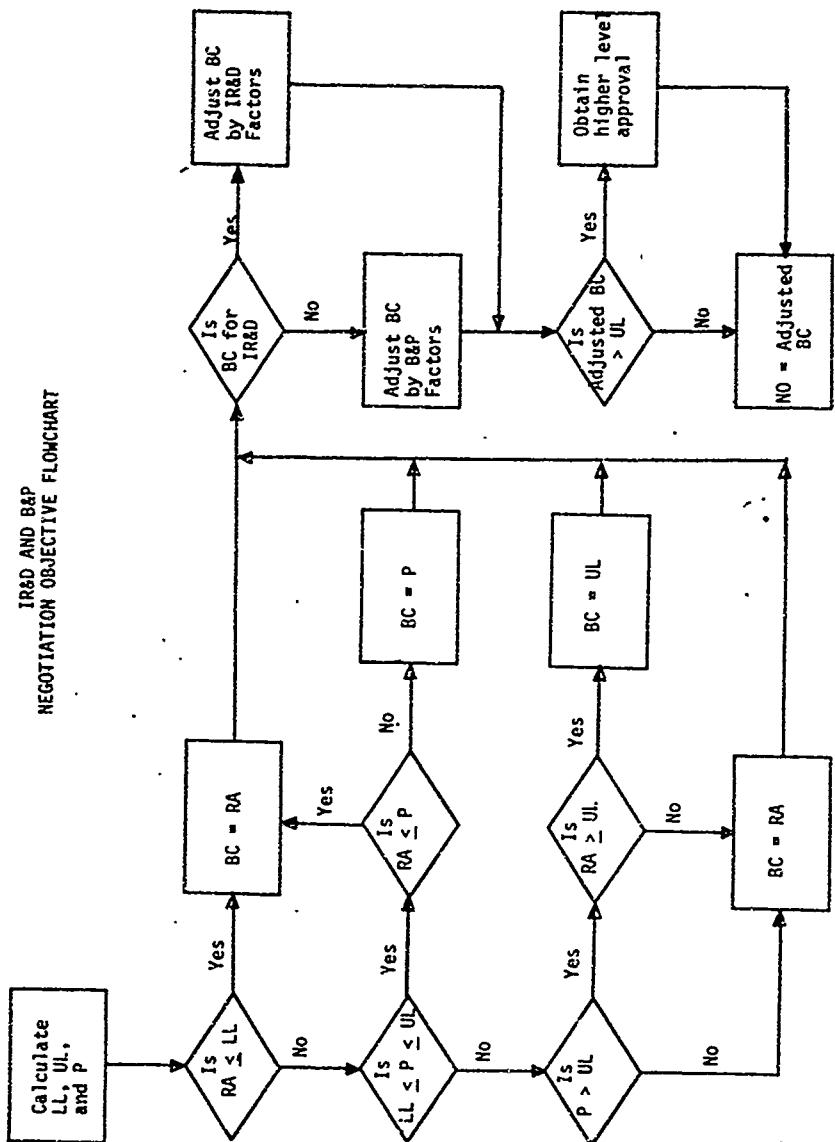
The previously mentioned DDR&E and ASD(i&L) memorandum of 21 October 1974 stated that the results of the technical quality evaluation of a contractor's IR&D program should have a meaningful and traceable effect on the ceiling negotiated. Since contractors' IR&D programs are periodically evaluated and are given numerical ratings by technical specialists of the three Services, several approaches are recommended. First, a stratification of the technical evaluation scores should be accomplished. Those companies which receive absolute scores which indicate technical excellence or mediocrity should be rewarded accordingly during negotiation. Secondly, changes in the evaluation of a company's IR&D program

from prior years should also be considered. Finally, it is recommended that a company's current research technological capability be evaluated by members of the Armed Services Research Specialist Committee. These subjective ratings would array companies by "the state-of-the-art" of their research technology capabilities and would be in addition to the technical evaluation of the companies' IR&D programs. Those companies deemed to have the highest and lowest R&D technology capability would be rewarded and penalized, respectively, when evaluating and negotiating IR&D ceilings.

G. FLOWCHART AND HIGHER LEVEL APPROVAL (IR&D & B&P)

A flowchart and definition of terms which depict the recommendations of this chapter are contained in Figure IV-1. The flowchart parallels the chapter's sequence of recommendations. One significant event not previously discussed is the recommendation for higher level approval. If the base calculation for IR&D as adjusted by the IR&D and B&P factors plus other subjective considerations exceed the upper limit which is defined as 120% of the base calculation amount, higher level approval is recommended prior to negotiations. If this calculation does not exceed the upper limit, the normal lower level prenegotiation review is in order. High level approval is recommended only in those cases where negotiation of sizeable increases in a contractor's IR&D and B&P programs is proposed. Hopefully, this will limit higher level involvement in accordance with the management by exception and the corporate management policy of the U.S. Army Materiel Development and Readiness Command.

FIGURE IV - 1
NEGOTIATION OBJECTIVE FLOWCHART



FIGUPE IV - 1 (Continued)

DEFINITION OF TERMS

RA = Requested Amount

S = Proposed Total Sales

C_1 = Highest Annual Cost of prior 3 years

C_2 = Second Highest Annual Cost of prior 3 years

R_1 = Highest ratio of actual cost to actual total sales of prior 3 years

R_2 = Second Highest ratio of actual cost to actual total sales of prior 3 years

LL = 80% Level = $(.4)(C_1 + C_2)$

UL = 120% Level or Ceiling = $(.6)(C_1 + C_2)$

P. = Product of proposed total sales and average of ratios =

$$\frac{(S)(R_1 + R_2)}{2}$$

BC = Base Calculation

NO = Negotiation Objective

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

There is limited guidance on the evaluation and negotiation of advance agreements for IR&D and B&P. Each of the three Services and the Defense Supply Agency have their own approaches to negotiating advance agreements. Although consistent treatment of contractors is the desired goal, it is uncertain whether the diverse evaluation and negotiation approaches now employed contribute to this objective. Off hand, it is felt that the structured and unstructured approaches presently used may produce significantly different results. Use of a structured approach will likely result in consistent, if not equitable, treatment. However, rationale for use of the current structured approaches are not adequately supported. Without more plausible justifications to support the evaluation and negotiation of advance agreements, questions concerning equity are difficult to answer. Recommendations directed toward resolving these concerns will now be made.

B. RECOMMENDATIONS

A structured approach for evaluating and negotiating advance agreements for IR&D and B&P is recommended to insure more consistent treatment of contractors by the three Services and the DSA. To insure that contractors with advance agreements are treated essentially the same as contractors that are subject to the ASPR formula, it is recommended that the ASPR formula method be used as a base calculation when negotiating advance agreements.

However, the results obtained after the ASPR formula is used must be adjusted by additional factors. Rationale for use of some of these factors is included in Chapter IV. In short, factors such as contractor contribution, DOD cost reimbursement contracts to IR&D, and technical assessment and evaluation of IR&D programs are recommended for consideration in the evaluation and negotiation of advance agreements for IR&D. For evaluation and negotiation of B&P, contractor contribution and contract mix are factors recommended for consideration. A structured and plausible approach which includes a base calculation and adjustment factors and which requires higher level approval prior to the negotiation of sizeable increases in a contractor's IR&D and B&P programs is this report's response to the study objective, i.e., develop a simple, equitable and creditable method of evaluating and negotiating IR&D and B&P costs. An approach which incorporates these features and which is explained in more detail in Chapter IV is recommended for "service-test" by the Army. "Service-test" of the approach in a real world situation will reveal deficiencies and permit refinement of the technique. After the service-test period and refinement of the technique, its use should be a helpful guide which will provide the Army with another and, hopefully, superior method of evaluating and negotiating advanced agreements for IR&D and B&P.

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APPENDIX
STUDY TEAM COMPOSITION

This study was conducted under the direction of Charles M. Scott, Associate Director for Procurement, US Army Materiel Development and Readiness Command. Members of the team were:

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C. Eugene Beeckler, Procurement Analyst, US Army Procurement Research Office, ALMC. BBA, University of Wisconsin, 1961. Mr. Beeckler was a Contract Specialist with the AMC Chicago Procurement District, the NIKE-X Project Office and various Commands assigned the Ballistic Missile Defense Program. Mr. Beeckler was also a Supervisory Contract Specialist/Contracting Officer with the US Army Procurement Agency, Europe, Frankfurt/Main, FRG. After a short assignment as a Contract Negotiator with the Army Missile Command, Mr. Beeckler joined the APRO.